

WHAT IS CLAIMED IS:

1 1. A process for the oxidation of methanol, ethanol, or mixtures thereof
2 comprising contacting the methanol and/or ethanol with an oxygen-containing gas and a
3 supported catalyst comprising one or more platinum group metal oxides.

1 2. A process according to claim 1 comprising oxidation of methanol.

1 3. A process according to claim 2 in which the product of the process
2 comprises primarily methyl formate.

1 4. A process according to claim 2 in which the product of the process
2 comprises dimethoxymethane and/or formaldehyde.

1 5. A process according to claim 3 in which the product further comprises
2 dimethoxymethane and/or formaldehyde.

1 6. A process according to claim 1 comprising oxidation of ethanol.

1 7. A process according to claim 6 in which the product of the process
2 comprises primarily diethoxyethane.

1 8. A process according to claim 1 comprising oxidation of a mixture of
2 methanol and ethanol.

1 9. A process according to claim 1 in which the surface density of the
2 platinum group metal oxide or oxides on the support is from about 20 % to about 300% of the
3 surface density of a monolayer of said oxide or oxides.

1 10. A process according to claim 1 in which the surface density of the
2 platinum group metal oxide or oxides is approximately that of a monolayer of oxide or
3 oxides.

1 11. A process according to claim 1 in which the support comprises a
2 material selected from alumina, silica, zirconia, titania, and mixtures thereof.

- 1 12. A process according to claim 11 in which the support comprises
- 2 alumina.
- 1 13. A process according to claim 11 in which the support comprises silica.
- 1 14. A process according to claim 11 in which the support comprises
- 2 zirconia.
- 1 15. A process according to claim 11 in which the support comprises
- 2 titania.
- 1 16. A process according to claim 11 in which the support comprises
- 2 stannic oxide.
- 1 17. A process according to claim 1 in which the support comprises one or
- 2 more reducible metal oxides.
- 1 18. A process according to claim 17 in which the one or more reducible
- 2 metal oxides are selected from reducible oxides of tin, iron, cerium, manganese, cobalt,
- 3 nickel, chromium, zirconium, rhenium, titanium, silver and copper, and mixtures thereof.
- 1 19. A process according to claim 17 in which the one or more reducible
- 2 metal oxides are selected from reducible oxides of tin, iron, cerium, zirconium, and mixtures
- 3 thereof.
- 1 20. A process according to claim 17 in which the one or more reducible
- 2 metal oxides comprises stannic oxide.
- 1 21. A process according to claim 17 in which the support comprises one or
- 2 more layers of a reducible metal oxide or a mixture of such oxides disposed on a particulate
- 3 alumina, silica, zirconia, or titania.
- 1 22. A process according to claim 21 in which the support comprises a layer
- 2 of stannic oxide disposed on a particulate alumina, silica, titania, or zirconia.

1 23. A process according to claim 1 in which the catalyst comprises one or
2 more ruthenium oxides.

1 24. A process according to claim 1 in which the catalyst comprises one or
2 more rhodium oxides.

1 25. A process according to claim 1 in which the catalyst comprises one or
2 more palladium oxides.

1 26. A process according to claim 1 in which the temperature is from about
2 30 to about 300°C.

1 27. A process according to claim 1 in which the temperature is from about
2 50 to about 180°C.

1 28. A process according to claim 1 in which the temperature is from about
2 80 to about 180°C.

1 29. A process for the production of a product comprising methyl formate
2 comprising contacting a material comprising methanol with an oxygen-containing gas and a
3 supported catalyst comprising one or more platinum group metal oxides.

1 30. A process according to claim 29 in which the product of the process
2 further comprises dimethoxymethane and/or formaldehyde.

1 31. A process according to claim 29 in which the surface density of the
2 platinum group metal oxide or oxides on the support is from about 20 % to about 300% of the
3 surface density of a monolayer of said platinum group metal oxide or oxides.

1 32. A process according to claim 27 in which the surface density of the
2 platinum group metal oxide or oxides is approximately that of a monolayer of said oxide or
3 oxides.

1 33. A process according to claim 29 in which the support comprises a
2 material selected from alumina, silica, zirconia, titania, and mixtures thereof.

- 1 34. A process according to claim 33 in which the support comprises
- 2 alumina.

- 1 35. A process according to claim 33 in which the support comprises silica.

- 1 36. A process according to claim 33 in which the support comprises
- 2 zirconia.

- 1 37. A process according to claim 33 in which the support comprises
- 2 titania.

- 1 38. A process according to claim 33 in which the support comprises
- 2 stannic oxide.

- 1 39. A process according to claim 29 in which the support comprises one or
- 2 more reducible metal oxides.

- 1 40. A process according to claim 39 in which the one or more reducible
- 2 metal oxides are selected from reducible oxides of tin, iron, cerium, manganese, cobalt,
- 3 nickel, chromium, zirconium, rhenium, titanium, silver and copper, and mixtures thereof.

- 1 41. A process according to claim 39 in which the one or more reducible
- 2 metal oxides are selected from reducible oxides of tin, iron, cerium, zirconium, and mixtures
- 3 thereof.

- 1 42. A process according to claim 39 in which the one or more reducible
- 2 metal oxides comprise stannic oxide.

- 1 43. A process according to claim 39 in which the support comprises one or
- 2 more layers of a reducible metal oxide or a mixture of such oxides disposed on a particulate
- 3 alumina, silica, zirconia, or titania.

- 1 44. A process according to claim 43 in which the support comprises a layer
- 2 of stannic oxide disposed on a particulate alumina, silica, titania, or zirconia.

1 45. A process according to claim 29 in which the catalyst comprises one or
2 more ruthenium oxides.

1 46. A process according to claim 29 in which the catalyst comprises one or
2 more rhodium oxides.

1 47. A process according to claim 29 in which the catalyst comprises one or
2 more palladium oxides.

1 48. A process according to claim 29 in which the temperature is from
2 about 30 to about 300°C.

1 49. A process according to claim 29 in which the temperature is from
2 about 50 to about 180°C.

1 50. A process according to claim 29 in which the temperature is from
2 about 80 to about 180°C.

1 51. A process for the production of a product comprising diethoxyethane
2 comprising contacting a material comprising ethanol with an oxygen-containing gas and a
3 supported catalyst comprising one or more platinum group metal oxides.

1 52. A catalyst comprising one or more platinum group metal oxides
2 supported on a support comprising one or more layers comprised of a reducible metal oxide
3 or a mixture of reducible metal oxides, the reducible oxide layer or layers being disposed on a
4 particulate support comprising alumina, zirconia, silica, titania, zirconia, stannic oxide, or a
5 mixture of two or more thereof.

1 53. A catalyst according to claim 52 in which the surface density of the
2 ruthenium oxide on the support is greater than that for the monomeric isolated platinum
3 group metal oxide or oxides.

1 54. A catalyst according to claim 52 in which the reducible metal oxide is
2 selected from reducible oxides of tin, iron, cerium, manganese, cobalt, nickel, chromium,
3 zirconium, rhenium, titanium, silver and copper, and mixtures thereof.

1 55. A catalyst according to claim 52 in which the reducible metal oxide is
2 selected from reducible oxides of tin, iron, cerium, zirconium, and mixtures thereof.

1 56. A catalyst according to claim 52 in which the reducible metal oxide
2 comprises stannic oxide.

1 57. A catalyst according to claim 52 comprising one or more ruthenium
2 oxides.

1 58. A catalyst according to claim 52 comprising one or more rhodium
2 oxides.

1 59. A catalyst according to claim 52 comprising one or more palladium
2 oxides.

1 60. A catalyst according to claim 52 in which the surface density of the
2 platinum group metal oxide or oxides on the support is from about 20 % to about 300 % of
3 the surface density of a monolayer of said platinum group metal oxide or oxides.

1 61. A catalyst according to claim 60 comprising one or more ruthenium
2 oxides.

1 62. A catalyst according to claim 60 comprising one or more rhodium
2 oxides.

1 63. A catalyst according to claim 60 comprising one or more palladium
2 oxides.

1 64. A catalyst according to claim 52 in which the surface density of the
2 platinum group metal oxide or oxides on the support is approximately that of a monolayer of
3 said oxide or oxides at the surface of the support.

1 65. A catalyst according to claim 64 comprising one or more ruthenium
2 oxides.

1 66. A catalyst according to claim 64 comprising one or more rhodium
2 oxides.

1 67 A catalyst according to claim 64 comprising one or more palladium
2 oxides.